

Slope-intercept form of a linear equation

$$y = mx + b$$

where m = slope and b = y -intercept

Point-slope form of a linear equation

$$y - y_1 = m(x - x_1)$$

where m = slope and (x_1, y_1) is a point on the line

Quadratic formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

where a , b , and c are coefficients in an equation of the form $ax^2 + bx + c = 0$

Parabola:

$$y = ax^2 + bx + c$$

Axis of symmetry:

$$x = \frac{-b}{2a}$$

Roots: where the graph crosses the x -axis.

Scientific Notation:

$$3.2 \times 10^{13}$$

The first number must be $1 \leq n < 10$

Direct Variation:

$y = kx$ where k = constant of variation
 $k = y/x$

Slope formula

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

where m = slope and (x_1, y_1) and (x_2, y_2) are points on the line

Exponents:

$$(-3)^2 \neq -3^2$$

$$x^m \cdot x^n = x^{m+n}$$

$$2^0 = 1$$

$$(x^n)^m = x^{n \cdot m}$$

$$4^{-3} = \frac{1}{4^3}$$

$$\frac{x^m}{x^n} = x^{m-n}$$

$$(xy)^n = x^n \cdot y^n$$

Absolute Value:

$$|-5| = 5$$

$$|5| = 5$$

Represents distance

Interval Notation:

$$(1, 5) \leftrightarrow 1 < x < 5$$

$$[1, 5] \leftrightarrow 1 \leq x \leq 5$$

Properties of Real Numbers:

Commutative Property: $a + b = b + a$

$$ab = ba$$

Associative Property: $a + (b + c) = (a + b) + c$

$$a(bc) = (ab)c$$

Distributive Property: $a(b + c) = ab + ac$

Identity: $a + 0 = a$

$$a \cdot 1 = a$$

Inverse: $a + (-a) = 0$

$$a \cdot (1/a) = 1$$

Zero Property: $a \cdot 0 = 0$

Reflexive $a + b = a + b$

Symmetric If $a = b$, then $b = a$

Transitive If $a = b$, and $b = c$, then $a = c$

Equations of Lines: m = slope

$y = mx + b$ slope-intercept

$y - y_1 = m(x - x_1)$ point-slope

Inequalities:

$$5 - 3x \leq 13 + x \quad \text{Remember to}$$

$$-3x \leq 8 + x \quad \text{change direction}$$

$$-4x \leq 8 \quad \text{of inequality when}$$

$$x \geq -2 \quad \text{mult/div by a negative.}$$

Slope:

$$m = \frac{\text{vertical change}}{\text{horizontal change}} = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$$

Parallel and Perpendicular:

Parallel: slopes are equal.

Perpendicular: slopes are negative reciprocals (flip over and negate)

Multiply: (distribute or FOIL)

$$(x+3)(x+2) = x \cdot x + x \cdot 2 + 3 \cdot x + 3 \cdot 2 \\ = x^2 + 5x + 6$$

$$(a+b)^2 = a^2 + 2ab + b^2$$

$$(a-b)^2 = a^2 - 2ab + b^2$$

Quadratic Equation:

$$x^2 - 5x + 6 = 0 \quad \text{Set } = 0.$$

$$(x-3)(x-2) = 0 \quad \text{Factor.}$$

$$x = 3; \quad x = 2 \quad \text{Find roots}$$

Function: Passes the vertical line test.

A set of ordered pairs in which each x element has only one y element associated with it.

$$f(x) = 3x + 4$$

$$f(3) = 3 \cdot 3 + 4 = 13$$

Literal equations:

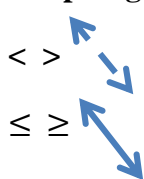
$a = b + cd$, solve for c .

$$a - b = cd$$

$$\frac{a-b}{d} = c$$

Use same strategies as for solving equations.

Graphing Linear Inequalities:



Less Than
Below:



Greater Than
Above:

Data:

5 Statistical Summary: minimum, maximum, median, 1st quartile, 3rd quartile

Quartiles divide data into 4 equal parts.

Percentiles divide data into 100 equal parts.

Percentile rank of score $x = \frac{\text{number of scores below } x}{n} \cdot 100$, where n is the number of scores.

Mean = average.

Mode = most often (may be more than one answer).

Median = middle.

Outliers = values that are far away from the rest of the data.

Median best describes data if outliers exist.

Range = difference between the maximum and minimum values.

Box-and-Whisker Plot:

Min: 65

Q1: 70

Median (Q2): 80

Q3: 90

Max: 100

The longer the box or whisker, the more spread out the data.

The shorter the box or whisker, the more tightly packed the data is.

Interquartile Range: $90 - 70 = 20$

Each quartile represents 25% of the data.

$$\frac{0}{k} = 0$$

$$\frac{N}{0} = \text{Undef.}$$

Factoring: $10x^2 + 22x + 12$

CHECK
FOR
GCF
FIRST!

$$2(5x^2 + 11x + 6)$$

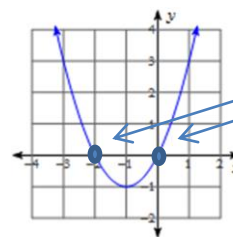
$$\begin{array}{ccc} & 30 & \\ +5 & \times & +6 \\ & 11 & \end{array}$$

$$2(5x + 5)(5x + 6)$$

$$\text{SIMPLIFY } 2(x + 1)(5x + 6)$$

Solution → Root → Zero → x-intercept:

$$y = x^2 + 2x$$



$$x = -2 \text{ \& } 0$$

Domain: x is all real numbers

$$\text{Range: } y \geq -1$$

FUNCTIONS:

Domain, Range, ordered pairs, functions

X Y (x,y) x does not repeat

Inverse Variation:

$$y = \frac{k}{x} \text{ where } k \text{ is the constant of variation}$$

$$k = xy$$

Simplifying Radicals:

a. $\sqrt{108x^9} = 6x^4\sqrt{3x}$

b. $\sqrt{50x^{12}y^{15}} = 5x^6y^7\sqrt{2y}$

c. $\sqrt{48x^8y^{16}} = 4x^4y^8\sqrt{3}$

Solving Systems:

****PUT EQUATIONS IN STANDARD FORM FIRST****

$$\begin{cases} ax + by = c \\ ax + by = c \end{cases}$$

THEN USE YOUR APP

Solving Equations:

$x = \#$ ONE Solution

$x = x$ INFINITE Solutions

$2 = 5$ NO Solutions

Writing Linear Equations:

$ax + by = c$ standard form

$y = mx + b$ slope-intercept form

m = slope & b = y-intercept

VUX

HOY

Vertical Line

Slope is Undef.

$$x = 2$$

Horizontal Line

Slope is ZERO

$$y = 2$$

Intercepts:

x-int (#, 0) y-int (0, #)

Statistics:

+ z-score = above mean

- z-score = below mean

0 z-score = equal to mean

Large z-score (e.g. 10) = less consistency in data and it is very spread out.

Small z-score (e.g. 1.5) = more consistency in data and it is close together.

